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ELECTROTECHNICAL VOCABULARY

PART 52 DATA PROCESSING

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ELECTROTECHNICAL VOCABULARY

PART 52 DATA PROCESSING

Section 14 Computer Graphics and Computer Micrographics

0. FOREWORD

0.1 This Indian Standard (Part 52/Sec 14) was adopted by the Indian Standards Institution on 31 October 1983, after the draft finalized by the Basic Standards on Electronics and Telecommunication Sectional Committee in consultation with Computers, Business Machines and Calculators Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 Electronic data processing is utilized for numerous exchanges and analysis of information of both intellectual and material nature. Application of electronic data processing becomes difficult, either because of the great variety of terms used in various fields to express the same concept, or because of the absence of or the imprecision of useful concepts. To overcome these barriers, this standard has been formulated.

0.3 This standard is one of the series of twenty Indian Standards on data processing vocabulary constituting Part 52 of the Electrotechnical Vocabulary, which deals with the main area of data processing classified under the following heads:

Section 1	Fundamental terms
Section 2	Arithmatic and logic operations
Section 3	Equipment technology
Section 4	Organization of data
Section 5	Representation of data
Section 6	Preparation and handling of data
Section 7	Digital computer programming
Section 8	Control, input—output and arithmetic equipment
Section 9	Data media, storage and related equipment
Section 10	Data communications
Section 11	Operating techniques and facilities
Section 12	Information theory
Section 13	Analogue and hybrid computing
Section 14	Computer graphics and computer micrographics
Section 15	Programming languages
Section 16	Data bases
Section 17	Data structures
Section 18	Information systems characteristics and development
Section 19	Reliability, maintenance and availability
Section 20	Control and integrity

0.4 Prime importance has been given to simplicity and clarity of the definitions so that it may be understood by all. It may, therefore, be felt that some definitions do not cover all the cases and exceptions.

0.5 Assistance has been derived in formulating this standard from 'Draft International Standard ISO/DIS 2382/13 Data Processing Vocabulary, Section 13 Computer Graphics' prepared by International Organization for Standardization.

1. SCOPE

1.1 This standard (Part 52/Sec 14) covers terms related to computer graphics and micrographics.

2. GENERAL CONCEPTS

2.1 Computer Graphics — Methods and techniques for converting data to or from graphic display via computers.

2.2 Coordinate Graphics/Line Graphics — Computer graphics in which display images are generated from display commands and coordinate data.

2.3 Raster Graphics — Computer graphics in which a display image is composed of an array of pixels arranged in rows and columns.

2.4 Display Command/Display Instruction — A command that controls the state or action of a display device.

2.5 Absolute Command/Absolute Instruction — A display command that causes the display device to interpret the data following the command as absolute coordinates.

2.6 Relative Command/Relative Instruction — A display command that causes the display device to interpret the data following the command as relative coordinates.

2.7 Addressability — The number of addressable points in each axis of a specified device space

2.8 Addressable Point — Any point of a device that can be addressed.

3. REPRESENTATION AND STORAGE OF IMAGES

3.1 Coded Image — A representation of a display image in a form suitable for storage and processing.

3.2 Absolute Coordinate — One of the coordinates that identify the position of an addressable point with respect to the origin of a specified coordinate system.

3.3 Relative Coordinate — One of the coordinates that identify the position on an addressable point with respect to some other addressable point.

3.4 Incremental Coordinate — A relative coordinate where the previously addressed point is the reference point.

3.5 User Coordinate — A coordinate specified by a user and expressed in a coordinate system that is device independent.

3.6 World Coordinate — A coordinate specified in a device-independent cartesian coordinate system used by the graphic system for specifying display elements.

3.7 Normalized Device Coordinate — A coordinate specified in a device-independent intermediate coordinate system normalized to some range, typically 0 to 1.

NOTE — A display image expressed in a normalized device coordinates lies in the same relative position when displayed on any device.

3.8 Device Coordinate — A coordinate specified in a coordinate system that is device dependent.

3.9 Display Element/Graphic Primitive/Output Primitive — A basic graphic element that can be used to construct a display image (*see* Fig. 1).

Examples: A det, a line segment, a character string.

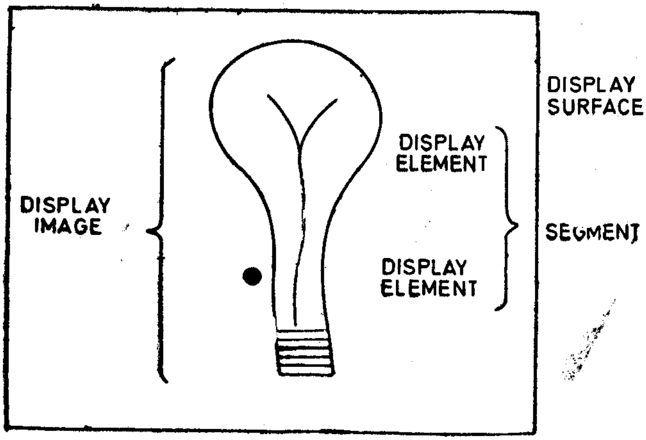

FIG. 1 DISPLAY ELEMENTS AND DISPLAY IMAGE

3.10 Hidden Line — A line segment that represents an edge obscured from view in a two-dimensional projection of a three-dimensional image.

3.11 Wire Frame Representation — A mode of display showing all edges of a three-dimensional object without distinguishing hidden lines.

3.12 Segment/Display Group — A collection of display elements that can be manipulated as a unit (*see* Fig. 1).

NOTE — A segment may consist of several and separate dots, line segments, or other display elements.

3.13 Marker — A glyph with a specified appearance which is used to indicate a particular location.

3.14 Input Primitive — An item of data obtained from an input device such as a keyboard, choice device, locator, pick device, or valuator.

3.15 Virtual Space — A space in which the coordinates of the display elements are expressed in a device-independent manner (*see* Fig. 2).

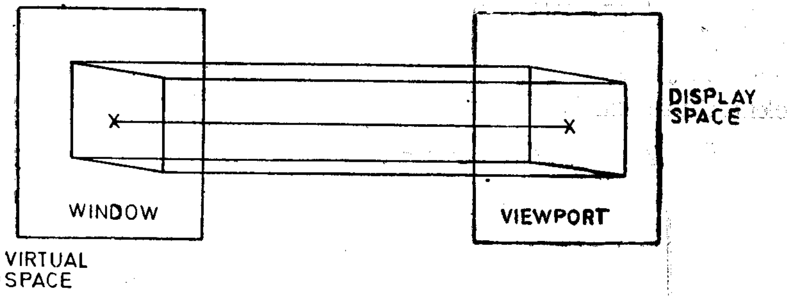

FIG. 2 WINDOW VIEWPORT TRANSFORMATION

4. DISPLAY OF IMAGES

4.1 Display — A visual presentation of data.

NOTE — This term pertains to the act of presentation as well as the result.

4.2 To Display — To present data visually.

4.3 Display Image — A collection of display elements or segments that are represented together at any one time on a display surface (*see* Fig. 1).

4.4 Soft Copy — A non-permanent display image.

Example : a CRT display.

4.5 Device Space — The space definied by the complete set of addressable points of a display device.

4.6 Display Space/Operating Space — That portion of the device space corresponding to the area available for displaying images (*see* Fig. 2).

4.7 Pixel/Picture Element — The smallest element of a display surface that can be independently assigned colour or intensity.

4.8 Absolute Vector — A vector whose start and end points are specified in absolute coordinates.

4.9 Incremental Vector/Relative Vector — A vector whose end point is specified as a displacement from its start point.

4.10 Increment Size — The distance between adjacent addressable points on the display surface.

4.11 Raster Unit — The unit of measure determined by the distance between adjacent pixels.

NOTE — The term 'Raster Unit' has been used in the past to denote increment size.

4.12 Plotter Step Size — The increment size on a plotter.

4.13 Blanking — The suppression of the display of one or more display elements or segments.

4.14 Blinking — An intentional periodic change in the intensity of one or more display elements or segments.

4.15 Flicker — An undesirable pulsation of display image on a cathode ray tube.

NOTE — Flicker occurs when the regeneration rate is too low with respect to the phosphor characteristics.

4.16 Wraparound — The display at some point on the display surface of the display elements whose coordinates normally lie outside of the display space.

NOTE — Wraparound occurs when coordinates of addressable points are calculated using modulo arithmetic. The consequence is the placement of logically adjacent points at the opposite edges of the addressable area.

5. FUNCTIONAL UNITS

5.1 Display Surface — In a display device, that medium on which display images may appear (*see* Fig. 1).

Example : The screen of a cathode ray tube; the paper in a plotter.

5.2 Display Console — A console that includes at least one display surface and may also include one or more input devices.

5.3 Raster Display Device — A display device in which display images are generated on the display surface by raster graphics.

5.4 Callingraphic Display Device/Directed Beam Display Device/Directed Beam Device — A display device in which the display elements of a display image may be generated in any programem-controlled sequence.

5.5 Storage Tube — A type of cathode ray tube (CRT) that retains a display image without requiring refresh.

5.6 Plasma Panel/Gas Panel — A part of a display device that consists of a grid of electrodes in a flat, gas-filled panel.

NOTE — The image can persist for a long period of time without refresh.

5.7 Drum Plotter — A plotter that draws a display image on a display surface mounted on a rotating drum.

5.8 Flatted Plotter — A plotter that draws a display image on a display surface mounted on a flat surface.

5.9 Raster Plotter — A plotter that generates a display image on a display surface using a line-by-line scanning technique.

5.10 Electrostatic Plotter — A raster plotter that uses a row of electrodes to fix the inks electrostatically on the paper.

5.11 Plotting Head — That part of a plotter used to create marks on a display surface.

5.12 Character Generator — A functional unit that converts the coded representation of a character into the graphic representation of the character for display.

5.13 Stroke Character Generator — A character that generates character images composed of line segments.

5.14 Dot Matrix Character Generator — A character generator that generates character images composed of dots.

5.15 Curve Generator — A functional unit that converts a coded representation of a curve into the graphic representation of the curve for display.

5.16 Vector Generator — A functional unit that generates directed line segments.

5.17 Locator — An input device providing coordinates of a position.

Examples : a mouse, a tablet.

5.18 Control Ball/Track Ball — A ball, rotatable about its centre that is used as an input device, normally as a locator.

5.19 Joy Stick — A lever with at least two degrees of freedom that is used as an input device, normally as a locator.

5.20 Thumb Wheel — A wheel, rotatable about its axis, that provides scalar value.

NOTE — A pair of thumb wheels can be used as a locator.

5.21 Mouse — A hand held locator operated by moving it on a surface.

NOTE — A mouse generally contains a control ball or pair of wheels.

5.22 Tablet — A special flat surface with a mechanism for indicating positions thereon, normally used as a locator.

5.23 Pick-Device — An input device used to specify a particular display element or segment.

Example : a light pen.

5.24 Light Pen — A light-sensitive pick device that is used by pointing it at the display surface.

5.25 Virtual Push Button/Light Button — Display elements used to simulate a function key by means of a pick device.

5.26 Valuator — An input device providing a scaler value.

Examples : a thumb wheel, a potentiometer.

5.27 Choice Device — An input device providing one value from a set of alternatives.

Example : a function keyboard.

5.28 Stroke Device — An input device providing a set of coordinates that work the path of the device.

6. PROCESSES AND METHODS OF OPERATION

6.1 Image Regeneration — The sequence of events needed to generate a display image from its representation in storage.

6.2 Refresh — The process of repeatedly producing a display image in a display surface so that the image remains visible.

6.3 Refresh Rate — The number of times per second at which a display image is produced for refresh.

6.4 Echo — The immediate notification of the current values provided by an input device to the operator at the display console.

6.5 Cursor — A movable, visible mark used to indicate the position on which the next operation will occur on a display surface.

6.6 Tracking — Moving a tracking symbol.

6.7 Tracking Symbol — A symbol on the display surface that indicates the position corresponding to the coordinate data produced by a locator.

6.8 Light-Pen Detection/Light-Pen Hit — The sensing by a light pen of light generated by a display element on a display surface.

6.9 Aiming Symbol/Aiming Circle/Aiming Field — On a display surface, a circle or other pattern of light used to indicate that the area in which the presence of a light pen can be detected at a given time.

6.10 Detectable Element (Segment) — A display element (segment) that can be detected by a pick device.

6.11 Rubber-Banding — Moving the common ends of a set of straight lines while the other ends remain fixed.

6.12 Inking — Creating a line by moving a locator over the display surface leaving a trail behind the locator in the manner of a pen drawing a line on paper.

6.13 Dragging — Moving one or more segments on a display surface by translating it along a path determined by a locator.

6.14 Highlighting — Emphasizing a display element or segment by modifying its visual attributes.

6.15 Translation — The application of a constant displacement to the position of one or more display elements.

6.16 Scaling — The application of a multiplicative factor to one or more display elements.

NOTE — For scaling in two or more directions, the same value is not necessarily required for each direction.

6.17 Rotation — Turning display elements about an axis.

6.18 Mirroring — Reflection of display elements about line or a plane,

6.19 Window — A predefined part of a virtual space (*see* Fig. 2).

6.20 Viewport — A predefined part of a display space (*see* Fig. 2).

6.21 Window/Viewport Transformation — A transformation that maps the boundary and contents of a window into the boundary and interior of a viewport (*see* Fig. 2).

6.22 Clipping — Removing those parts of display elements that lie outside a given boundary.

6.23 Shielding/Reverse Clipping — Suppression of all or parts of display elements falling within a specified region.

6.24 Scrolling — Moving a window vertically or horizontally in such a manner that new data appears within the viewport as old data disappears.

6.25 Rolling — Scrolling restricted to an upward or downward direction.

6.26 Zooming — Progressively scaling the entire display image to give the visual impression of movement of all or part of a display group toward or away from an observer.

NOTE — The scaling value must be the same in all directions.

6.27 Tumbling — Dynamic display of the rotation of display elements about an axis the orientation of which is continuouly changing in space.

6.28 Panning — Progressively translating the entire display image to give visual impression of lateral movement of the image.

6.29 Background Image/Static Image — That part of a display image, such as a form overlay, that is not changed during a particular sequence of transactions.

6.30 Foreground Image/Dynamic Image — That part of a display image that can be changed for every transaction.

6.31 Form Overlay — A pattern such as a report form, grid or map used as a background image.

6.32 Form Flash — The display of a form overlay.

7. COMPUTER MICROGRAPHICS

7.1 Computer Micrographics — Methods and techniques for converting data to or from microform with the assistance of a computer.

NOTE — A microform is usually a microfilm or a microfiche.

7.2 Computer Output Microfilming (COM) — A technique for converting and recording data from a computer directly into a microform.

7.3 Computer Output Microfilmer/COM Device — A device for computer output microfilming.

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/M^2

INDIAN STANDARDS INSTITUTION

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Printed at S C Sharma Printers, New Delhi, India